



Armed Forces College of Medicine

(AFCM)

Histology Department



Hemopoiesis Leukopoiesis

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Intended Learning Objectives (ILO)



By the end of this lecture the student should be able
to:

- **Describe** the cellular changes along the series of granulopoiesis
- **Interpret** the changes in the band neutrophil and blast cells count in the different diseases.

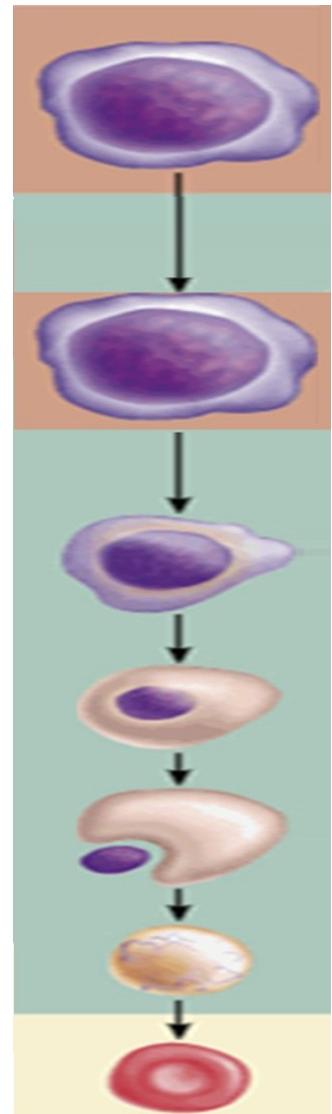
Lecture Plan



1. Part 1 (3 min) Introduction to granulopoiesis
2. Part 2 (40 min) steps of granulopoiesis and lymphopoiesis
3. Part 3 (3 min) Summary
4. Lecture Quiz (4 min)



Hemopoietic stem cells



**Hemopoietic
Stem cells
(BM)**

Self renewal

High potentiality (all the blood cell types + non-blood)

**Progenitor
cells
(CFU)**

**Less self renewal
Less potential**

Committed to produce specific blood cells (= Form colonies of only one cell type)

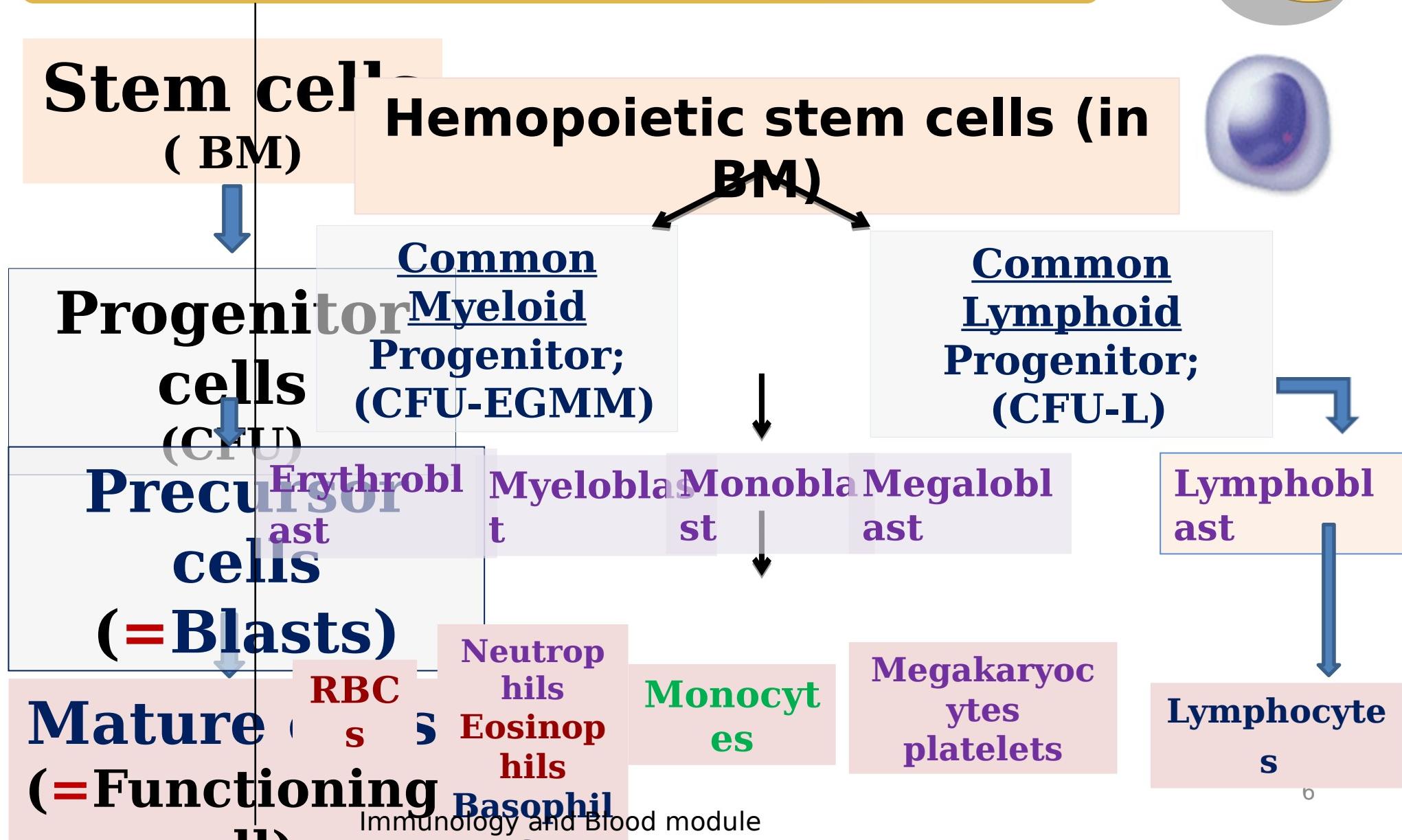
**Precursor
cells
(=Blasts)**

Gradually acquire the characteristic shape of the mature cells

**Mature cell
(=Functioning cell)**



Hemopoietic cells



Notice changes in:

- Size
- Nucleus
- Cytoplasm

Granulopoiesis



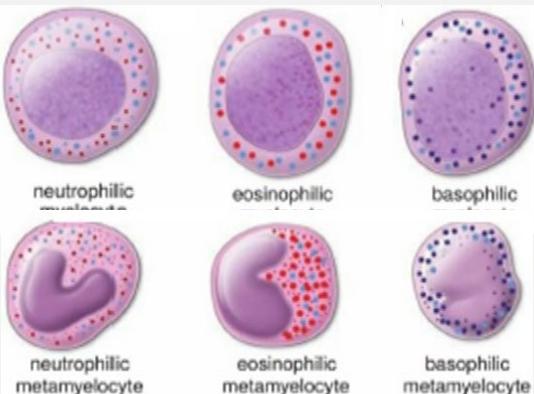
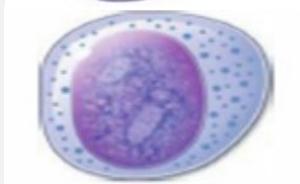
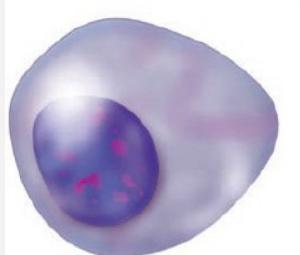
Common Myeloid Progenitor (CFU-EGMM)

Myeloblasts

(N: large, fine chromatin, faint nucleoli)

Basophilic Cytoplasm

(No granules)



Promyelocytes

(N: course chromatin prominent nucleoli)

Cytoplasm

Basophilic

(azurophilic

gr. appear)

Myelocytes

(N: eccentric, coarse chromatin) (last mitosis)

Baso-, Acido-, Neuropil C.

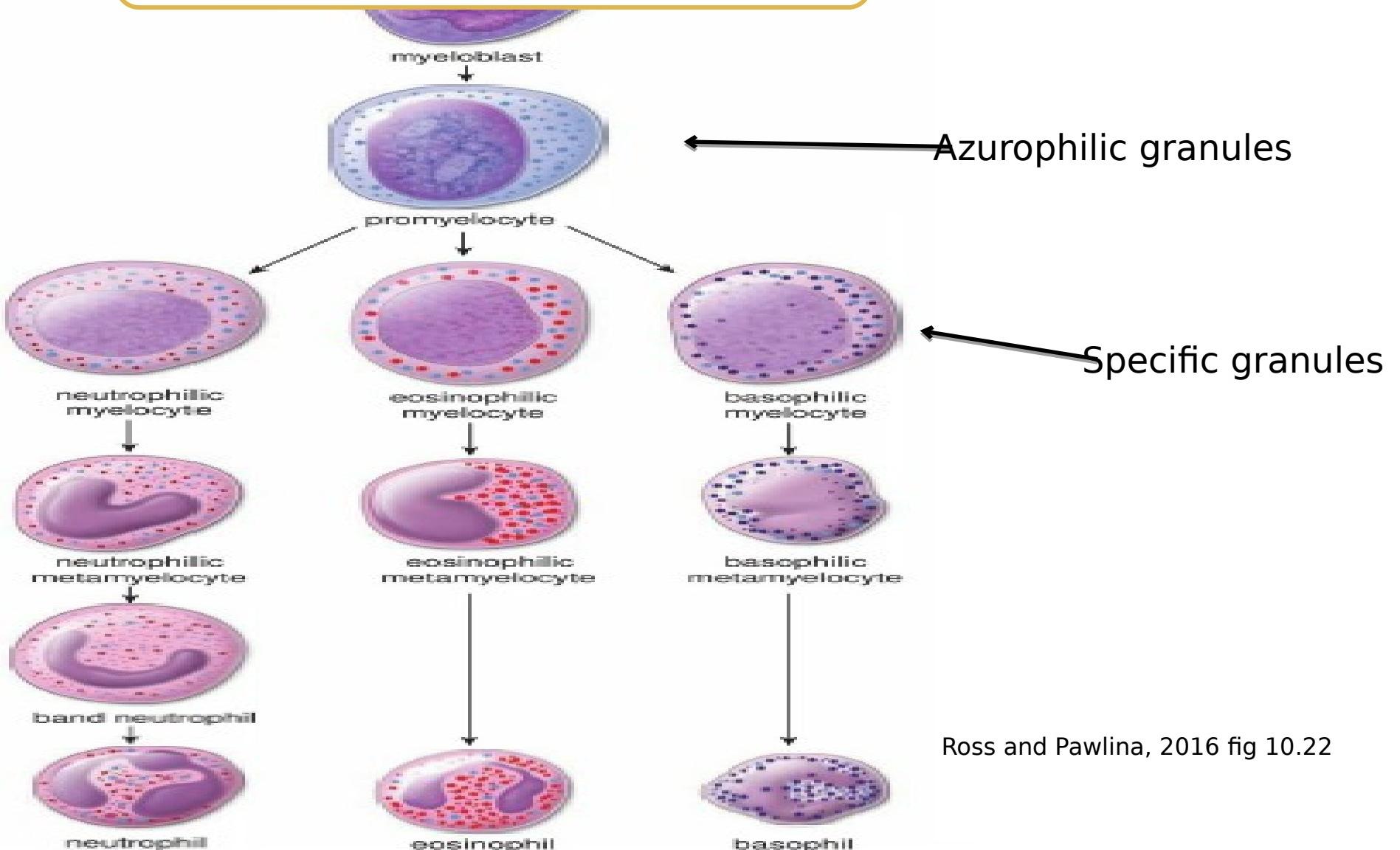
(Azurophilic gr. and

specific gr.)

Band cell

Granulopoiesis

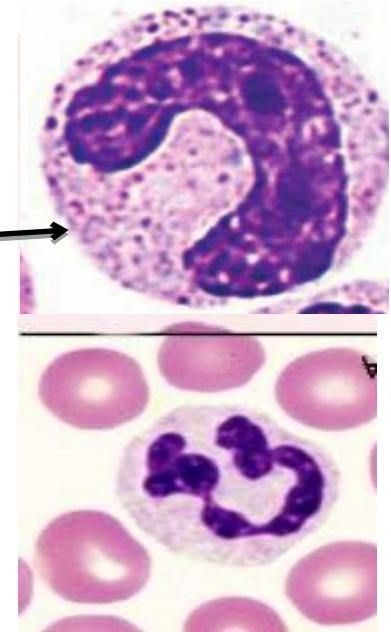
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Ross and Pawlina, 2016 fig 10.22

Granulopoiesis: Band neutrophils

- Before complete maturation of neutrophils, they pass through an intermediate stage in which the **nucleus** has a horse-shoe shape (**band neutrophils**).
- Then the nucleus becomes **lobulated** (2-5 lobes) forming **mature neutrophils**.



Ross and Pawlina 2016, plate 20

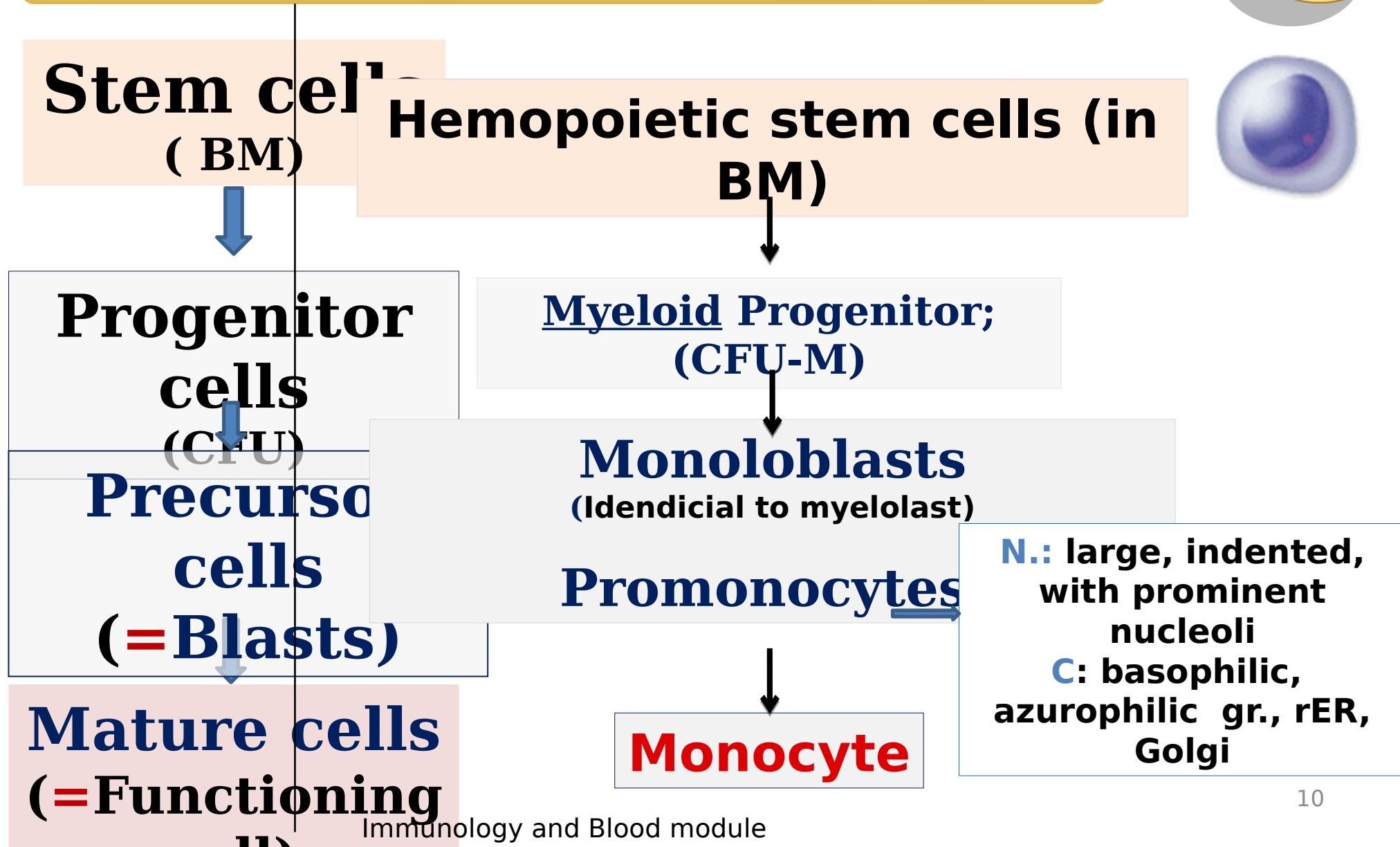
High number of band neutrophils in blood

(shift to the left)

indicates ongoing bacterial infection

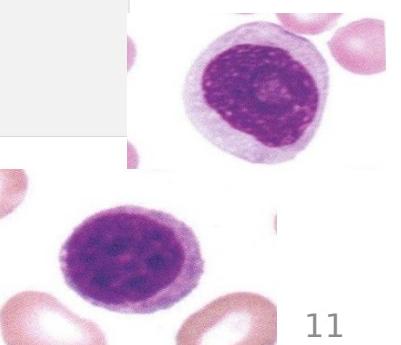
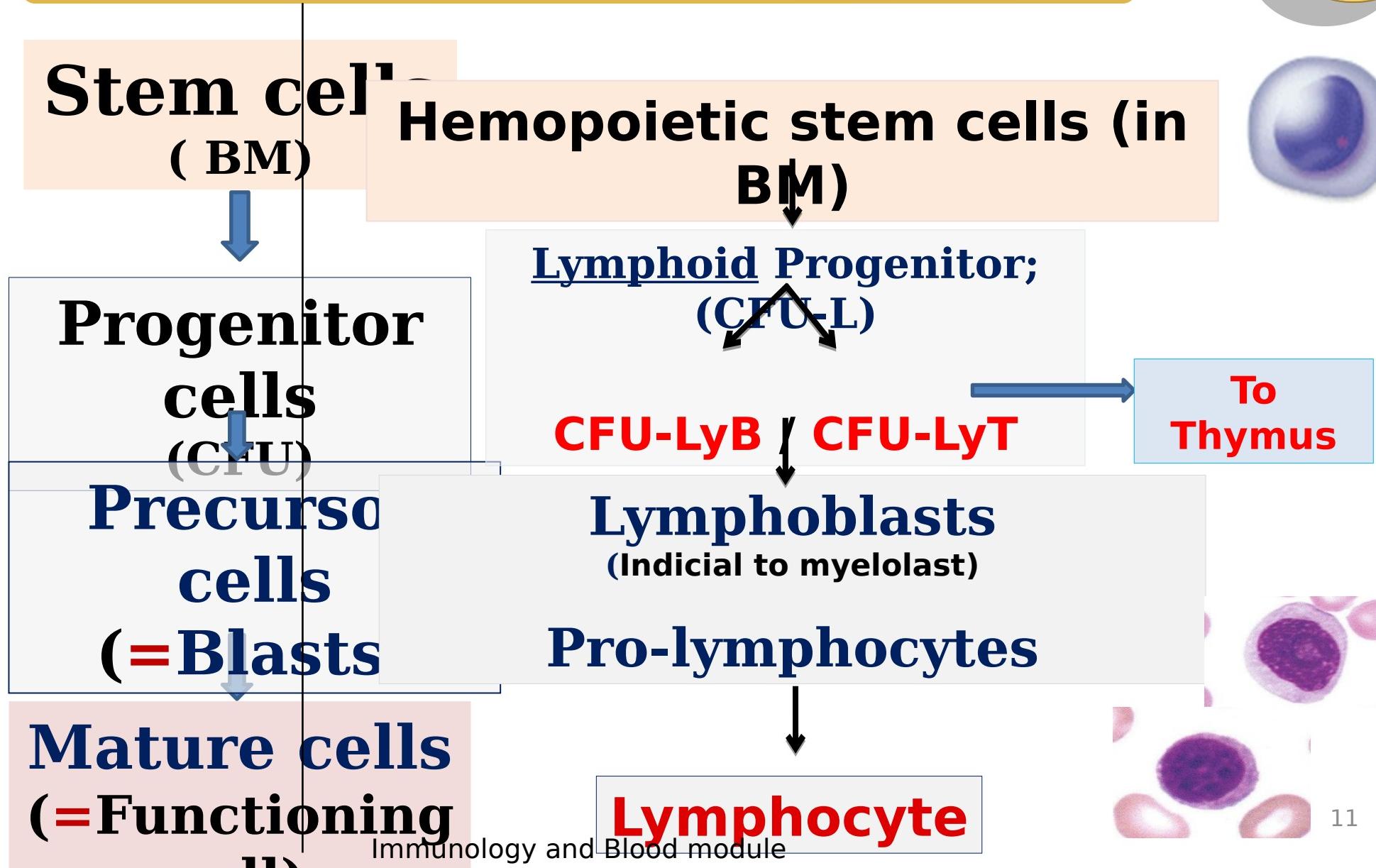


Monocytopoiesis





Lymphopoiesis



Lecture Quiz

Lecture Quiz



**Band neutrophils count increases in cases
of -----**

**The cells with highest capacity of self
renewal are -----**

Give reasons

- Blast cells have basophilic cytoplasm
- Presence of 3 types of myelocytes

SUGGESTED TEXTBOOKS



- 1. Junqueira`s Basic Histology; Text and Atlas. 12th edition 2015.**
- 2. Histology A Text and Atlas: Michael H. Ross and Wojciech Pawlina, 7th edition, 2016.**



Thank
you

